

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
7 August 2003 (07.08.2003)

PCT

(10) International Publication Number  
**WO 2003/065766 A3**

(51) International Patent Classification<sup>7</sup>: **H05B 3/00**, 7/00,  
H01L 21/00, C23C 16/48

(21) International Application Number:  
PCT/EP2003/001516

(22) International Filing Date: 29 January 2003 (29.01.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
02075507.0 30 January 2002 (30.01.2002) EP

(71) Applicants (for all designated States except US): **N.V. BEKAERT S.A.** [BE/BE]; Bekaertstraat 2, B-8550 ZW-  
EVEGEM (BE). **ENERGY CONVERSION DEVICES,**  
INC. [US/US]; 1675 West Maple Road, Troy, MI 48084  
(US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **DE BOSSCHER,**  
Wilmert [BE/BE]; Noordhoutstraat 22, B-9031 DRON-  
GEN (BE). **DENUL, Jurgen** [BE/BE]; Krekelstraat  
119, B-9800 DEINZE (BE). **GOBIN, Guy** [BE/BE]; H.

Hartlaan 29, B-8400 OOSTENDE (BE). **PERSOONE,**  
Bart [BE/BE]; Fazantenpark 9, B-9800 DEINZE (BE).  
**DOEHLER, Joachim** [US/US]; 2109 Stanwood Drive,  
Santa Barbara, CA 93103 (US).

(74) Agent: **MESSELY, Marc**; N.V. BEKAERT S.A., Bekaert-  
straat 2, B-8550 ZWEVEGEM (BE).

(81) Designated States (national): AE, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,  
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,  
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,  
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,  
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE,  
SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US,  
UZ, VC, VN, YU, ZA, ZM, ZW.

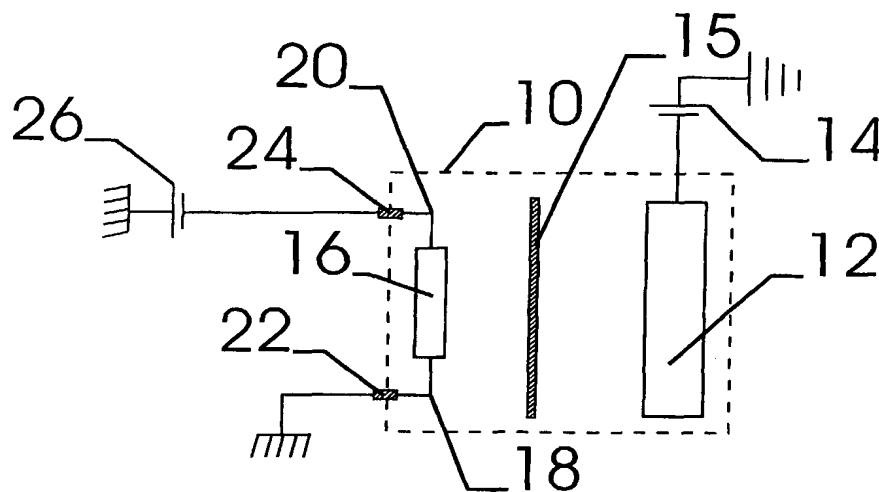
(84) Designated States (regional): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,  
ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK,  
TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,  
GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

[Continued on next page]

(54) Title: HEATING IN A VACUUM ATMOSPHERE IN THE PRESENCE OF A PLASMA



(57) Abstract: A method of heating in a vacuum atmosphere in the presence of a plasma, comprises the following steps :a) providing infrared radiation means (16) in a vacuum chamber(10) ;b) providing a first electrical conductor (18) to the infrared radiation means (16) ;c) providing a second electrical conductor (20) from the infrared radiation means (16) ;d) putting an electrical voltage over said infrared radiation means (16) ; e) preventing the first conductor (18) and the second conductor (20) from having an electrical voltage above +55 Volt.The advantage is that arcing is avoided.



— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**(88) Date of publication of the international search report:**  
15 January 2004

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 03/01516

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H05B3/00 H05B7/00 H01L21/00 C23C16/48

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H05B H01L C23C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EP0-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 086 679 A (FOGGIATO GIOVANNI ANTONIO ET AL) 11 July 2000 (2000-07-11) column 27, line 9 - line 15 -----	1-10, 12

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

21 August 2003

Date of mailing of the international search report

17. 11. 2003

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Taccoen, J.

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/EP 03/01516

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.: 12  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:  
see FURTHER INFORMATION sheet PCT/ISA/210
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-12

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

-----

Continuation of Box 1.2

Claims Nos.: 12

Present claim 12 relate to an extremely large number of possible "devices" (See lines 29-32, page 11) In fact, the claims contain so many options, variables, possible permutations and provisos

that a lack of clarity (and/or conciseness) within the meaning of Article 6 PCT arises to such an extent as to render a meaningful search of the claims impossible. Consequently, the search has been carried out for those parts of the application which do appear to be clear (and/or concise), namely those parts relating to the device being "infrared radiation means"

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-12:Searched

---

2. claim: 13: Not searched:

---

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 03/01516

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
US 6086679	A	11-07-2000	AU	1188899 A		17-05-1999
			JP	2001521293 T		06-11-2001
			WO	9922043 A1		06-05-1999
-----						